Training discussion

PNO

Inspire Improve Impact

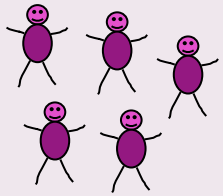
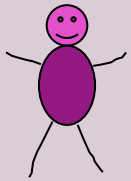
FRONtleR ITN – Kick off

Geneva, 19 February 2014

Training objetive

- **Training the next generation of creative and entrepreneurial researchers to deal with the emerging field of fiber optic sensors in innovative application areas!**

ITN training structure

Level	Content		Implementation examples
	Scientific skills/knowledge	Transferable skills/knowledge	
Network-wide  relevant to all	For example: • introductory courses to the main disciplines of the project • training of basic skills required in the field	For example: • project management • IPR • grant writing • Presentation • Communication • training on industry relevant knowledge and processes	• Summer schools • specially organised training events for all fellows or defined sub-group • attendance of existing courses by all fellows • parallel training sessions at different project partners
Individual 	• Depending on the tasks and profile of the fellow • For example: a certain type of analysis only to be used by this fellow	• Depending on local opportunities, tasks and the training needs of the fellow • For example: language of the host country	• Training-on-the-job • visits to project partners • training courses • one-to-one sessions

FOS4HEP training programme

Training Programme A: Common Mandatory Network Training seminars

All ESR fellows engaged within the FOS4HEP Project will be required to fulfil this *basic scientific training* programme to establish the foundation for a successful PhD. We propose three network organised key seminars.

Seminar 1: Introduction and Fundamentals FOS4HEP Course (one week): This introduction course will be organised and hosted at CERN and will include the following courses:

1. *Presentation of the scientific and training aims of the programme by the coordinators of all CPRTs;*
2. *Scientific master classes on basic relevant knowledge for Fibre Optic Sensors capabilities.*
3. *Introduction of OPTOSMART as industrial partner and presentation of other relevant industrial partners, including the Associated industrial partner LAER, ELANTAS, BNG, ASG, ANTE, AMS and TEMAI.*
4. *Initiation of an Inter/Intranet site for the FOS4HEP Project;*
5. *Introduction to the complementary courses available.*
6. *Dissemination Plan approach, IPR, business and confidentiality issues and code of conduct for publication.*

***Seminar 2*: Advanced FOS4HEP science (two week):** This module organised by Partner CRDC and CERN is intended to provide a substantive background to the specific activities within the consortium

1. *Fundamentals of Optics (3 days): the basic principle of optic will be introduced; Maxwell equations, Snell's law, Fresnel equations, wave guide conditions, etc... (provided by CRDC, CERN, Cantabria)*
2. *Fundamentals of Optoelectronic (3 days): Optoelectronic devices and integrated photonic devices; Electroptical phenomena in active optoelectronic devices: lasers, photodiodes, modulators switch (by CRDC, Cantabria)*
3. *Fundamentals of Electronic Measurements (2 days): Measurements, Error theory, Signal manipulation, etc…(provided by CRDC, CERN, Atomki)*
4. *Fundamentals of Data Acquisition (3 days): Sampling Theory, Digital quantization, Signal conditioning, A/D & D/A data conversion, etc……(provided by CRDC, CERN, Atomki, UNL)*
5. *Electronics for signal conditioning and numerical manipulation (4 days): Operational Amplifier, Analogical Filters, RF signal manipulation, Lock-in, etc…(provided by CRDC, Cantabria)*
6. *Introduction to High Energy Physics detectors (2 days): Interaction of particles with matter, charged particle tracking, Calorimetry, vertex detectors, particle identification, muon detection. Colliding experiments, neutrino and gamma experiments…(provided by CRDC, CERN, Cantabria)*
7. *Fundamentals of Acceleration Machines (2 days): Revision on relativity and electromagnetism. Introduction to particle accelerators. Charged particle. Transverse/Longitudinal beam dynamics. Linear imperfections and non-linear resonances. Linear accelerators. Cyclotrons. Synchrotron radiation. Injection and extraction. Space charge and instabilities, etc…(provided by CERN, Cantabria)*
8. *Materials, Polymers, Composites and Production. (4 days). Polymer and composite engineering properties, composite materials mechanics. (provided by CRDC, CERN, Cantabria, UNL)*

***Seminar 3*: Applied FOS4HEP technologies (one week):** This module jointly organised by Partner CRDC, OPTOSMART and CERN will provide background in aspects of practical development of the field;

1. *Design of Sensors (2 days): Industrial Prototyping Design, Design of Transducers, Use and Design of Optoelectronic Systems for FOS sensors, Innovative Material for FOS sensors, (by Optosmart, CERN, CRDC)*
2. *Design of Sensing System (2 days): Design of complex Sensing Systems, Patch Cords Cabling Connectors and Splicing, FOS large array management, etc…. (provided by Optosmart, CERN)*
3. *How to submit an EU scientific-technological proposal (provided by CRDC, CERN)*
4. *Management of international scientific projects (provided by CERN)*
5. *Patent rules and application development (provided by Optosmart, CERN)*

Training module	Description	Host	Days
Scientific Ethics	Engage research trainees in reading, considering, and discussing the responsible conduct of science.	local	1 day
Scientific writing	Writing and structuring of reports	local	1 day
Basic presentation skills	Planning, structuring and delivering (scientific)	local	2 days
IPR	IPR agreements with industry, complexity of patent law, ethics of exclusive vs. non-exclusive licensing	Local and part seminars 1	1 day
Business skills	Training on business development and commercial exploitation	Part of seminar 1	1 day
Grant writing skills	Introduction to the process of writing effective grant applications	Local and part of seminar 3	2 days
Design of experiments	Experimental design	local	1 day
Language training	If required, provided locally, once/ week for 3 months)	local	regular
Health & Safety	Provided at commencement of work placement	local	1/2 day
Project management	Familiarisation with key management techniques	Local and part of TOK workshop I	1 day
Communication/Media	How to receive and send the right messages	Local	1 day
Career development	Applying for jobs and preparing for interviews	local	1 day
Managing people	Preparing ERs for junior group leader function	local	1 day
Advanced presentation skills	Posters, talks, and more	local	1 day
Journal Clubs	Fellows will participate in fortnightly journal clubs which will help develop critical literature appraisal skills	local	1 day

Table B.3.3a: Complementary Training

Adaptation of training programme

- **Which modules can/should be maintained?**
- **Which new modules do we need due to the additional application areas in the project? And who will be responsible for these?**
- **What type of module can we include to teach the ESRs hands-on innovation skills that help them to convert knowledge and ideas into products and services?**

Individual training

- **Which partners will recruit a researcher?**
- **What should be the focus of his/her work in the project?**
- **Which other partners should each researcher visit during the project?**

Recruitment schedule

Fellow	Partner	Individual project	WP	Secondments
1				
2				
3				
4				
5				
6				
7				
8				
1				
2				
11				
12				
13				